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**TECHLAW INC.**

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January 22, 2003

DCN: RR7-TLI-07YX-01-MN-0628

Mr. Thomas Lorenz  
U.S. Environmental Protection Agency  
Region 7  
Superfund Division  
Federal Facilities and Special Emphasis Branch  
901 North 5<sup>th</sup> Street  
Kansas City, Kansas 66101

Re: EPA Contract No. 68-W-01-051; EPA Work Assignment No. 07-YX  
TechLaw Project No. RR7-K07; St. Louis (ex) Army Ammunition Plant  
Meeting Notes - January 15, 2003

Dear Mr. Lorenz:

Enclosed are the Meeting Notes for the St. Louis (ex) Army Ammunition Plant site. This report summarizes the meeting attended by TechLaw Senior Geologist, Steve Bryant, on January 15, 2003.

If you have any questions regarding this submittal, please contact me at (913) 236-0006, extension 104 or Steve Bryant at extension 108.

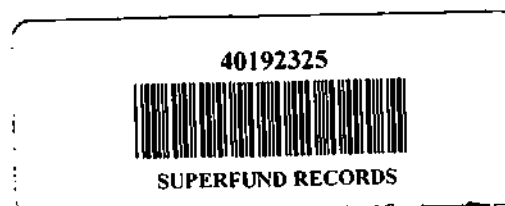
Sincerely,

**TechLaw, Inc.**

Fred Molloy  
Senior Project Manager

Enclosure

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**MEETING NOTES  
JANUARY 15, 2003  
ST. LOUIS (ex) ARMY AMMUNITION PLANT  
ST. LOUIS, MISSOURI**

**Submitted to:**

**U.S. Environmental Protection Agency  
Region 7  
Superfund Division  
Federal Facilities and Special Emphasis Branch  
901 North 5<sup>th</sup> Street  
Kansas City, Kansas 66101**

<b>Work Assignment No.:</b>	<b>07-YX</b>
<b>Contract No.:</b>	<b>68-W-01-051</b>
<b>Date Prepared:</b>	<b>January 22, 2003</b>
<b>Prepared By:</b>	<b>TechLaw, Inc. Steve Bryant (913) 236-0006 extension 108</b>
<b>TechLaw Project No.:</b>	<b>RR7-K07</b>
<b>EPA Primary Contact:</b>	<b>Thomas Lorenz</b>
<b>Telephone No.:</b>	<b>(913) 551-7292</b>

**MEETING NOTES**  
**ST. LOUIS (ex) ARMY AMMUNITION PLANT**  
**ST. LOUIS, MISSOURI**

**JANUARY 15, 2003**

**1.0 Introduction**

Under the Region 7 Regional Oversight Contract [(ROC) Contract No. 68-W-01-051], TechLaw, Inc., (TechLaw) was tasked with providing technical assistance to the EPA Region 7, Superfund Division, Federal Facilities and Special Emphasis Branch. TechLaw was issued Work Assignment Number 07-YX to provide technical oversight support to EPA at the former St. Louis Army Ammunition Plant (SLAAP), in St. Louis, Missouri.

On January 15, 2003, TechLaw Senior Geologist, Steve Bryant, attended a meeting at the offices of URS Corporation, Inc., (URS) in Overland Park, Kansas. Attendees included representatives from the U.S. Environmental Protection Agency, Region 7 (EPA); the Missouri Department of Natural Resources (MDNR); the U.S. Army Aviation and Missile Command (AMCOM) and their contractor, Titan; Versar, contractor to Headquarters-Department of the Army Base Realignment and Closure (HQDA BRAC); the U.S. Army Corps of Engineers (USACE); and URS. A copy of the meeting attendance list is included as Attachment 1.

The objective of the meeting was to review and discuss the analytical data and proposed contingency sampling related to the Site-specific Environmental Baseline Survey (SSEBS) conducted by URS.

**2.0 Meeting Notes**

Introductions and Opening Remarks

The meeting began at 8:00 AM with the distribution of a meeting agenda by Bob Skach of URS (included as Attachment 2) and brief introductions by each attendee. Following introductions, discussions included the language and other text-related issues for the Finding of Suitability for Expedited Transfer (FOSET) by AMCOM for SLAAP. Additional opening remarks included the transfer of site management responsibilities from AMCOM to HQDA BRAC.

Preliminary Review of SSEBS Findings

Following introductions, FOSET discussions, and other opening remarks, Matt Phoenix and Mike Mason of URS presented a building-by-building summary of the results of the SSEBS. URS had initially intended to provide a brief summary of the site history and of the December 2000 Site-wide Environmental Baseline Survey (EBS) Report by Tetra Tech, Inc. However, based on a consensus of meeting attendees, all relatively familiar with the site, URS did not discuss these items, as shown on pages 1 and 2 of the URS handout.

The presentation continued with a discussion of the SSEBS Work Plan and field investigation conducted in August and September 2002 by URS. These items are shown on pages 3 and 4 of the URS handout. The field investigation portion of the presentation included the following topics.

- Regional Background - Data for the regional background surface soil samples (0-6 inch depth interval) were presented, as shown on page 4 of the handout. Discussions by attendees focused on the relatively high total lead and zinc concentrations reported. Jim Harris, MDNR, stated that the relatively high total lead and zinc concentrations may be due to a lack of representative data, and suggested that URS contact the MDNR Department of Geology and Land Survey for any published data on naturally-occurring background metals in soil.
- Building 1 - Results are presented on page 4 of the URS handout.
- Building 2 - Results are presented on pages 5 and 6 of the URS handout. Additional discussions by attendees included the approach to public release of the URS data and EPA split sampling data for dioxins in soil samples collected during the SSEBS (included in Attachment 2). Representatives from EPA, MDNR, AMCOM, USACE, and HQDA BRAC contractor, Versar, expressed concern regarding the political pressure from the City of St. Louis to release raw SSEBS data. The concerns included potential public reaction to the findings of low-level dioxins in on-site soil and concrete, and the impacts that dioxin findings may have on demolition and debris disposal requirements, should future site owners desire to demolish Building 2.
- Building 4 - Results are presented on pages 6 and 7 of the URS handout.
- Building 5 - Results are presented on pages 7 and 8 of the URS handout.
- Building 6 - Results are presented on pages 8 and 9 of the URS handout.
- Building 7 - Results are presented on page 9 of the URS handout.
- Building 8 - Results are presented on pages 9 and 10 of the URS handout.
- Building 10 - Results are presented on page 10 of the URS handout.
- Northeast Parking Area - Results are presented on page 11 of the URS handout.
- Railroads - Results are presented on page 11 of the URS handout.
- Roadways - Results are presented on page 11 of the URS handout.
- Sewer System - Results are presented on pages 11 through 15 of the URS handout.
- Groundwater - Results are presented on pages 15 and 16 of the URS handout.

Bob Skach of URS also briefly discussed preparation of the Baseline Human Health Risk Assessment (HHRA), presented on pages 16 and 17 of the URS handout. Mr. Skach stated that URS' risk assessment specialist, Jim Garrison, was unable to attend the meeting due to illness. He also stated that data from contingency sampling will be used for characterizing the nature and extent of contamination, however, that data will be included in the HHRA if determined to be applicable. Mr. Skach then stated that URS will use a "hybrid well" (the maximum concentrations detected in any on-site groundwater monitoring well) for the evaluation of on-site worker exposure to groundwater in the HHRA.

### Proposed Contingency Sampling Plan

Following data discussion, Mike Mason presented URS' proposed Contingency Sampling Plan (included as Attachment 3.) Attendees agreed with the proposed Contingency Sampling Plan as presented, with the following comments: Jim Harris of MDNR suggested that URS also conduct one round of water level measurements at all on-site monitoring wells; Tom Lorenz, EPA, suggested that URS consider reducing the number of proposed sewer sediment samples from five to one or two downstream of Building 2, because the sewer sediment data will not be used for the HHRA - attendees agreed; Brad Eaton, USACE, requested that URS re-issue the Contingency Sampling Plan for regulatory review and approval, and that URS include the rationale for sampling, along with a proposed schedule for completion from the date funding is obtained; Mr. Eaton stated that the contingency sampling schedule will ultimately depend on funding by USACE; Mr. Lorenz requested that EPA be given at least two-weeks advance notice of the contingency sampling fieldwork so that EPA can arrange for collection of split samples; and URS agreed to proceed with the Contingency Sampling Plan, as requested.

### URS Slideshow

Following discussions on the SSEBS data and proposed Contingency Sampling Plan, URS presented select slides found by Arrowhead during interior wall demolition in Building 3. The slides consisted of historical photographs of aerial and interior views of various site features and processes.

### Meeting Closeout

The meeting concluded at approximately 3:15 PM. Informal discussions followed the meeting.

**ATTACHMENT 1**  
**MEETING ATTENDANCE LIST**

**URS Greiner Woodward Clyde**

Job \_\_\_\_\_ Project No. \_\_\_\_\_ Page \_\_\_\_\_ of \_\_\_\_\_  
Description \_\_\_\_\_ Computed by \_\_\_\_\_ Sheet \_\_\_\_\_ of \_\_\_\_\_  
Checked by \_\_\_\_\_ Date \_\_\_\_\_

Reference

Steve Bryant	TeelLaw/Inc.	913-236-0006
Sandy Olinger	AMCOM	256 313-1718
Heather Black	Titan	256-313-1710
Bob Skach	URS	913-344-1158
MIKE MASON	URS	913-344-1034
Matt Phoenix	URS	913-344-1085
Jim Harris	MDNR	573 526-2736
Brad Eaton	USACE	916 983-381
Jeroy Preston	HQDA BRAC-VERSO	404-464-6375
Tom Lorenz	USEPA	913-551-7292

**ATTACHMENT 2**

**URS HANDOUT**

**DRAFT**

**CONFIDENTIAL**

**Agenda - January 15, 2003**

- 0800 - 0830 Introductions / Begin Meeting
- 0830 - 1000 Preliminary Review of SSEBS Findings
- 1000 - 1015 Break
- 1015 - 1200 Introduce and Discuss Proposed Contingency Sampling Plan
- 1200 - 1300 Lunch
- 1300 - 1600 Discuss and Finalize Contingency Sampling Plan
- 1600 - 1700 Develop Schedule for Contingency Sampling and Final Report Timetable

**ST. LOUIS ARMY  
AMMUNITION PLANT**

**SITE-SPECIFIC  
ENVIRONMENTAL BASELINE  
SURVEY**

**Preliminary Review of SSEBS Findings**

**Outline**

- Site History
- Review of Environmental Baseline Survey (EBS) Report (December, 2000) and Development of Site-Specific EBS (SSEBS) Work Plan
- SSEBS Field Investigation
- Results of SSEBS Field Investigation
- Baseline Human Health Risk Assessment (HHRA)

**Site History**

- 1941: Begin St. Louis Ordnance Plant (SLOP) small arms production
- 1944: Conversion to 105 mm Howitzer shell production, designated as St. Louis Army Ammunition Plant (SLAAP)
- 1984: Renovated office space
- 1989: Industrial equipment removed
- 1998: Site vacant
- 2002: Demolition of Building 3

**Review of Environmental  
Baseline Survey (EBS) Report  
(December, 2000) and  
Development of Site-Specific  
EBS (SSEBS) Work Plan**

**Sampling Activities**

- Installation/sampling of 9 monitoring wells
- Asbestos Containing Material (ACM) survey
- 34 soil borings
- 49 wipe samples
- 21 sediment/surface soil samples
- 4 wastewater/sump samples
- 24 concrete samples

### Areas Requiring Further Investigation

- Site Wide
  - Sewer System
  - Underground Storage Tank (UST) areas
  - Transformer areas
  - Metal storage areas
  - Sumps
  - Groundwater

### Areas Requiring Further Investigation (cont.)

- Building 1
  - Sumps (PCBs, Metals)
  - PCB oil stain
  - Metals in storage yard soils
  - Soils near breaking machines (PCBs, Metals)
  - Soils under building (TPH, PCBs, VOCs)

### Areas Requiring Further Investigation (cont.)

- Building 2
  - PCBs near former hydraulic fluid storage areas
  - Soils beneath building (TPH, SVOCs, PCBs, VOCs)
  - Sediment in manholes (VOCs)
  - Dioxin sampling at locations with PCB detections in high-heat areas

### Areas Requiring Further Investigation (cont.)

- Building 4
  - PCB oil stain
  - Sumps and compressor pits (PCBs)
- Building 5
  - Elevator (PCBs)
  - Storage area south of building (TPH)

### Areas Requiring Further Investigation (cont.)

- Building 6
  - Lab and Darkroom (Metals)
  - Storage area south of building (TPH)
  - PCBs on basement surfaces
- Building 7
  - Oil stain (TPH)
  - Cooling Tower Blowdown Sediments (Cr<sup>+6</sup>)

### Areas Requiring Further Investigation (cont.)

- Building 8
  - SVOCs in soil
  - Pipe trench leading to Building 2 (TPH)
- Building 9
  - Explosives in soil
- Building 10
  - UST closure not completed

### Site-Specific EBS (SSEBS) Work Plan

- Address areas identified as requiring additional investigation
- Collect unbiased data for a Baseline Human Health Risk Assessment (HHRA)
- Phased approach to sample collection
  - Initial round of primary samples
  - Subsequent round of contingency samples to further define extent of contamination

### Site-Specific EBS (SSEBS) Work Plan (cont.)

- Establish Screening Levels (SLs) for Chemicals of Concern at the Site
  - Selection of SLs that ensures data that supports assessment of risk and allows flexibility in the decision making process
    - EPA Region IX Residential Preliminary Remediation Goals (PRGs)
    - Cleanup Levels for Missouri (CALM) - Scenario A (Residential)
    - Background levels determined for Metals and PAHs

### SSEBS Field Investigation

- Field work conducted from August 12 - September 20, 2002
- Most primary samples collected as planned except the following notable exceptions
  - Sewer system
    - Sediment and Wastewater not found at all projected sampling locations - reduced number of samples
    - Sewers located very deep in areas, bedrock encountered prior to third sample depth

### SSEBS Field Investigation (cont.)

- (Exceptions continued)
  - Building 1
    - Only one sump observed in SW corner, sample 01SB-09 eliminated
    - Obstruction encountered after collecting shallow and middle samples, offset to collect deep sample
  - Building 2
    - Concrete and Product samples not in Work Plan added for PCB analysis

### SSEBS Field Investigation (cont.)

- (Exceptions continued)
  - Building 6
    - Wall in basement prevented access to sample locations RA-06SB-08 and RA-06SB-16, samples were not collected
  - Building 7
    - No Sediments observed beneath Cooling Tower, sample not collected
    - Piping and concrete between Cooling Tower and Pump House obstructed sampling equipment, deeper samples at RA-07SB-10 not collected

### SSEBS Field Investigation (cont.)

- (Exceptions continued)
  - Groundwater
    - Chloride and Fluoride analyses added to three of the new wells located near Fire Hydrant (also sampled for these new parameters)
    - Additional soil boring (08SB-MW02) sampled near monitoring well 08MW-02 due to odor encountered during installation of well

## Results of SSEBS Field Investigation

- Regional Background
- Building 1
- Building 2
- Building 4
- Building 5
- Building 6
- Building 7
- Building 8
- Building 10
- Northeast Parking Area
- Railroads
- Roadways
- Sewer System
- Groundwater

## Regional Background - Metals

Parameter	Minimum Detection	Maximum Detection	95% Upper Tolerance Limit
Antimony	nd	nd	na
Arsenic	3.4	18	21.4
Barium	114	376	679
Beryllium	0.57	1.4	1.6
Cadmium	1.9	6.3	7.1
Chromium	14	43	48.3
Copper	17	148	401
Lead	14	176	1036
Mercury	0.015	0.12	0.44
Nickel	13	40	43.7
Selenium	3.3	10	16.3
Silver	nd	nd	na
Thallium	0.17	0.44	0.53
Zinc	60	302	1068

Note: All results in mg/kg  
 na - not applicable  
 nd - not detected

## Regional Background - PAHs

Parameter	Minimum Detection	Maximum Detection	95% Upper Tolerance Limit
Acenaphthene	0.001	0.94	1.1
Acenaphthylene	0.001	0.165	0.31
Anthracene	0.004	2.4	2.8
Benzo(a)anthracene	0.003	6.2	7.2
Benzo(a)pyrene	0.003	3.3	4.1
Benzo(b)fluoranthene	0.006	4.2	4.9
Benzo(g,h,i)perylene	0.023	2.1	2.5
Benzo(k)fluoranthene	0.002	2.1	2.5
Chrysene	0.005	6	7.0
Dibenz(a,h)anthracene	0.013	1.3	1.5
Fluoranthene	0.008	13	15.2
Pyrene	0.001	1	1.2
Indeno(1,2,3-cd)pyrene	0.022	1.3	2.0
Naphthalene	0.002	0.165	0.37
Phenanthrene	0.003	13	15.2
Pyrene	0.006	71	12.8

Note: All results in mg/kg

## Building 1



## Building 1 Summary Table

Sample Type	# of Samples Collected	# of Samples with Detections above Screening Level				
		Metals	PAHs	PCBs	TPH	VOCs
Concrete	2	na	na	1	na	na
Soil - Equipment Sumps	6	na	na	0	0	na
Soil - Billet Entry Points	9	0	na	na	na	na
Soil - Billet Entry Points	3	na	0	0	0	0
Soil - SW Sump	3	na	na	0	na	na
Soil - Process Sumps	9	0	na	1	0	na
Soil - Billet Storage Yards	18	0	na	na	na	na
Soil - Risk Assessment	30	1	0	0	na	0

## Building 1 Results

- Concrete
  - Samples collected at 0-1" and 2-3" depths from one location
  - PCB-1254 detected at concentration of 0.431 mg/kg in 0-1" sample (Soil Screening Level (SL) = 0.22 mg/kg)
- Soil
  - SE Process Sump sample 01SB-10(0-0.5) had detection of PCB-1254 at a concentration of 0.35 mg/kg (SL = 0.22 mg/kg)
  - Risk Assessment sample RA-01SB-03(0-0.5) had detection of Copper at 1260 mg/kg (SL = 1100 mg/kg)

## Building 2



## Building 2



## Building 2 Summary Table

Sample Type	# of Samples Collected	# of Samples with Detections above Screening Level						
		Asbestos	Lead	Mercury	PAHs	PCBs	THI	VOCs
Asbestos	20	0	00	00	00	00	00	00
Concrete	10	00	00	00	00	9	00	00
Product	2	00	00	00	00	1	00	00
Surface Wipe	1	00	00	00	00	1*	00	00
Soil - Equipment Areas	12	00	7	00	00	1	3	00
Soil - General Trench	15	00	5	00	00	0	00	00
Soil - Test Pit	20	00	11	0	00	3	4	0
Soil - Risk Assessment	36	00	13	0	0	1	00	1

\* No Screening Level for Surface Wipe Sample

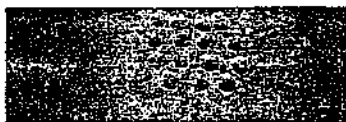
## Building 2 Results

- Refractory Bricks
  - 2 types of refractory bricks were sampled
  - 10 samples of each
  - All samples were determined to be non-asbestos containing



## Building 2 Results (cont.)

- Concrete
  - All samples collected from 0-1" depth only
  - PCB-1248 detected in 9 samples at concentrations ranging from 0.411 to 9.6 mg/kg (Soil SL = 0.22 mg/kg)
  - PCB-1260 detected in 3 samples at concentrations ranging from 0.091 to 0.6 mg/kg (Soil SL = 0.22 mg/kg)



## Building 2 Results (cont.)

- Product
  - PCB-1248 detected at concentration of 10 mg/kg (Soil SL = 0.22 mg/kg) in 02PD-01 in SE corner of building
  - No PCBs detected in 02PD-02 from West Mezzanine



### Building 2 Results (cont.)

- Surface Wipes
  - Sample was collected from oil-coated wires in a trench
  - PCB-1248 was detected (No Screening Level)



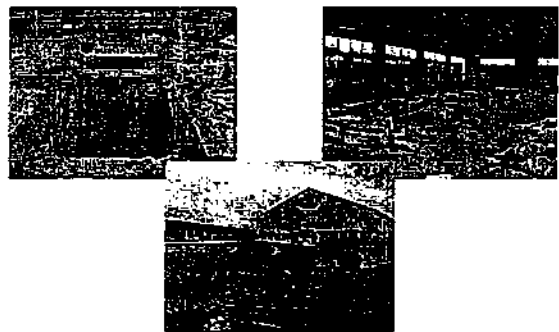
### Building 2 Results (cont.)

- Soils
  - Dioxins
    - 36 Detections above Screening Level (TEQ SL = 2,3,7,8-TCDD EPA Region IX PRG = 3.9 pg/g)
      - 0 - 1 feet: 8 Detections above TEQ SL
      - 2 - 5 feet: 8 Detections above TEQ SL
      - 6 - 10 feet: 14 Detections above TEQ SL
      - 11 - 15 feet: 4 Detections above TEQ SL
      - >15 feet: 2 Detections above TEQ SL
    - Min = 3.917 pg/g; Mean = 52.60 pg/g; Max = 313.8 pg/g

### Building 2 Results (cont.)

- Soils (cont.)
  - PCBs
    - 5 Detections of PCB-1248 above Screening Level (SL = 0.22 mg/kg)
      - Min = 1 mg/kg; Mean = 5 mg/kg; Max = 14 mg/kg
  - TPH
    - 7 Detections of TPH above Screening Level (SL = 200 mg/kg)
      - Min = 250 mg/kg; Mean = 1,675 mg/kg; Max = 3,603 mg/kg
  - VOC
    - 1,1-Dichloroethene detected at concentration of 0.11 mg/kg (SL = 0.054 mg/kg) at boring location RA-02SB-12 at a depth of 9 to 10 feet

### Building 4



### Building 4 Summary Table

Sample Type	# of Samples Collected	# of Samples with Detections above Screening Level					
		Metals	PAHs	PCBs	Pesticides	TPH	VOCs
Concrete	4	na	na	2	na	na	na
Surface Wipe	4	na	na	0	na	na	na
Soil - PCB Stain	3	na	na	0	na	na	na
Soil - Compressor Pits	6	na	na	0	na	0	na
Soil - Risk Assessment	28	1	0	0	0	na	0

### Building 4 Results

- Concrete
  - Samples collected at 0-1" and 2-3" depths from one location (04CS-01) and only 0-1" at two other locations
  - PCB-1248 detected at concentrations of 0.97 and 1.2 mg/kg in surface samples at 04CS-02 and 04CS-03 (Soil SL = 0.22 mg/kg)
- Surface Wipes
  - No detections above the Screening Levels for PCBs

### Building 4 Results (cont.)

- Soils
  - No detections above Screening Levels for PAHs, PCBs, Pesticides, TPH or VOCs
  - One detection of Metals above Screening Level, Beryllium at RA-04SB-02
    - Depth was 2 to 3'
    - Concentration was 1.9 mg/kg
    - Screening Level = 1.6 mg/kg

### Building 5



### Building 5 Summary Table

Sample Type	# of Samples Collected	# of Samples with Detections above Screening Level						
		Explosives	Metals	PAHs	PCBs	Pesticides	TPH	VOCs
Mastic	3	na	na	na	3*	na	na	na
Surface Wipe	1	na	na	na	0	na	na	na
Soil - Oil Storage Pad	3	na	na	0	na	na	0	na
Soil - Risk Assessment	32	0	1	1	0	1	na	0

\* No Screening Level for Mastic Samples

### Building 5 Results

- Mastic
  - All 3 samples had detections for PCBs
  - PCB-1248: 0.41 - 1.5 mg/kg
  - PCB-1254: 0.22 - 3.1 mg/kg
- Surface Wipe
  - No detections above the Screening Limit for PCBs

### Building 5 Results (cont.)

- Soil Borings
  - Oil Storage Pad - no detections above the Screening Level for PAHs or TPH
  - Risk Assessment Locations
    - Only detections above Screening Level were at location RA-05SB-05, shallow depth of 0-6 inches
    - Metals
      - Lead detected at concentration of 1790 mg/kg (SL = 1039)

### Building 5 Results (cont.)

- Soil Borings
  - Risk Assessment Locations (cont.)
    - PAHs detected above Screening Level
      - Benzo(a)anthracene - 25 mg/kg (SL = 7.2 mg/kg)
      - Benzo(a)pyrene - 19 mg/kg (SL = 4.1 mg/kg)
      - Benzo(b)fluoranthene - 16 mg/kg (SL = 4.9 mg/kg)
      - Benzo(g,h,i)perylene - 14 mg/kg (SL = 2.5 mg/kg)
      - Benzo(k)fluoranthene - 19 mg/kg (SL = 6.2 mg/kg)
      - Dibenzo(a,h)anthracene - 7.1 mg/kg (SL = 1.5 mg/kg)
      - Indeno(1,2,3-cd)pyrene - 11 mg/kg (SL = 2.0 mg/kg)
      - Phenanthrene - 33 mg/kg (SL = 15.2 mg/kg)

## Building 5 Results (cont.)

- Soil Borings
  - Risk Assessment Locations (cont.)
    - Pesticides detected above Screening Level
      - ~ 4,4'-DDE at concentration of 65 mg/kg (SL = 1.7 mg/kg)
      - ~ 4,4'-DDT at concentration of 1,100 mg/kg (SL = 1.7)

## Building 6



## Building 6 Summary Table

Sample Type	# of Samples Collected	# of Samples with Detections above Screening Level						
		Explosives	Metals	PAHs	PCBs	Pesticides	SVOCs	TPH
Mastic	3	na	na	na	3*	na	na	na
Sediment	1	na	1	na	na	na	0	na
Surface Wipe	1	na	0	na	na	na	0	na
Surface Wipe	4	na	na	na	0	na	na	na
Soil – Oil Storage Pad	3	na	na	0	na	na	na	na
Soil – Risk Assessment	28	0	5	0	0	2	na	na

\* No Screening Level for Mastic Samples

## Building 6 Results

- Mastic
  - All 3 samples had detections for PCBs
  - PCB-1248: 1.2 to 4.9 mg/kg
  - PCB-1254: 0.73 to 10 mg/kg



## Building 6 Results

- Sediment
  - Taken in Old HVAC System Duct
  - Metals detected above Screening Levels
    - Arsenic at concentration of 23 mg/kg (Soil SL = 21.4 mg/kg)
    - Chromium at concentration of 222 mg/kg (Soil SL = 210 mg/kg)
    - Lead at concentration of 2610 mg/kg (Soil SL = 1038 mg/kg)
    - Mercury at concentration of 3.6 mg/kg (Soil SL = 0.6 mg/kg)



## Building 6 Results (cont.)

- Surface Wipes
  - All detections below Screening Levels
- Soils
  - Oil Storage Pad - no detections above the Screening Levels for PAHs or TPH
- Risk Assessment Borings
  - 4,4' DDT detected above Screening Level (1.7 mg/kg) at RA-06SB-04
    - 4 mg/kg at depth of 0 to 1 1/2 feet
    - 21 mg/kg at depth of 2 to 3 feet

## Building 6 Results (cont.)

- Risk Assessment Borings (cont.)
  - Beryllium and Mercury detected above Screening Levels (1.6 and 0.6 mg/kg) in the following borings
    - RA-06SB-02(0-0.5): Mercury at concentration of 1.5 mg/kg
    - RA-06SB-03(0-0.5): Beryllium at concentration of 1.6 mg/kg
    - RA-06SB-04(0-0.5): Mercury at concentration of 0.85 mg/kg
    - RA-06SB-04(02-03): Mercury at concentration of 0.92 mg/kg
    - RA-06SB-05(0-0.5): Mercury at concentration of 0.94 mg/kg

## Building 7



## Building 7 Summary Table

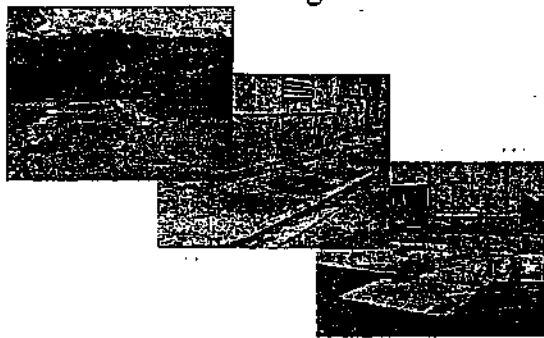
Sample Type	# of Samples Collected	# of Samples with Detections above Screening Level				
		Metals	PAHs	PCBs	TPH	VOCs
Concrete	2	na	na	0*	1*	na
Soil - Oil Stain	3	na	na	na	0	na
Soil - Risk Assessment	44	0	0	1	na	0

\* One sample analyzed for each set of compounds

## Building 7 Results

- Concrete
  - Samples collected at 0-1" (TPH analysis) and 2-3" (PCB analysis) depths from one location
  - TPH-DRO detected in surface sample only at a concentration of 2000 mg/kg (Soil SL = 200 mg/kg)
- Soils
  - Samples beneath oil stain in building were below Screening Level (200 mg/kg) for TPH
  - Only detection in Risk Assessment samples was 0.34 mg/kg PCB-1254 at RA-07SB-02(0-0.5)

## Building 8



## Building 8 Summary Table

Sample Type	# of Samples Collected	# of Samples with Detections above Screening Level				
		Metals	PAHs	PCBs	TPH	VOCs
Sediment	2	na	na	na	0	na
Soil - Monitoring Well	1	na	na	na	0	na
Soil - Pipe Trench	21	na	na	na	1	na
Soil - Risk Assessment*	1	0	0	0	0	0
Soil - Risk Assessment	60	0	0	0	na	1

\* = One discretionary sample was collected at location RA-08SB-15.

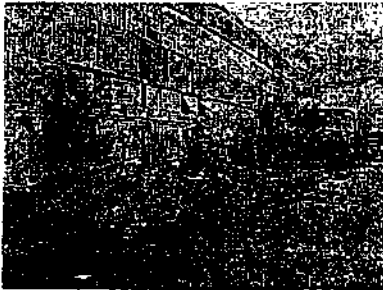
### Building 8 Results

- Sediments
  - No detections above Screening Level for TPH
- Soil (Monitoring Well)
  - Additional boring adjacent to monitoring well 08MW-02 did not detect TPH contamination above Screening Level
- Soil (Pipe Trench)
  - One detection of TPH above SL (200 mg/kg) at 08SB-07, concentration was 1065 mg/kg

### Building 8 Results

- Soil (Risk Assessment)
  - Discretionary sample collected at RA-08SB-15 did not detect TPH above the Screening Level
  - 1,1-Dichloroethene detected at concentration of 0.17 mg/kg (SL = 0.054 mg/kg) at boring location RA-08SB-05 at a depth of 0 to 0.5 feet

### Building 10



### Building 10 Summary Table

Sample Type	# of Samples Collected	# of Samples with Detections above Screening Level	
		BTEX	TPH
Soil - UST Closure	17	0	0

### Building 10 Results

- All soil boring samples collected at Building 10 were below Screening Level for BTEX and TPH
- Discretionary samples at deeper borings SRSB-18 and SRSB-19 in this area had detections of TPH above the SL (200 mg/kg) of 550 and 600 mg/kg
- SRSB-16 located northeast of Building 10 had a detection of TPH at a concentration of 530 mg/kg at a depth of 6 to 7 feet

### Additional Risk Assessment Areas

- Northeast Parking Area
- Railroads
- Roadways



### Additional Risk Assessment Areas Summary Table

Investigation Area - Sample Type	# of Samples Collected	# of Samples with Detections above Screening Level				
		Explosives	Metals	PAHs	PCBs	VOCs
Northeast Parking Area - Soil Boring	24	na	0	0	0	0
Railroads - Soil Boring	33	na	0	0	0	1
Roadways - Soil Boring	84	na	3	0	0	1
Roadways - Soil Boring (Former Building 9 Area)	12	0	0	0	0	0

### Northeast Parking Area Results

- Metals
  - No Detections above Screening Levels
- PAHs
  - No Detections above Screening Levels
- PCBs
  - No Detections above Screening Levels
- VOCs
  - No Detections above Screening Levels

### Railroads Results

- Metals
  - No Detections above Screening Levels
- PAHs
  - No Detections above Screening Levels
- PCBs
  - No Detections above Screening Levels
- VOCs
  - 1,1-Dichloroethene detected at RA-RRSB-10 (0-0.5')
  - Concentration of 0.0751 mg/kg (SL = 0.054 mg/kg)

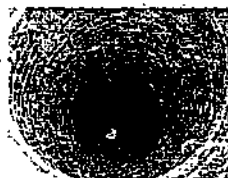
### Roadways Results

- Explosives
  - Analyzed only in samples RA-RDSB-13, -13E, -14, and -14E due to proximity to former Building 9
  - No detections above Screening Levels
- Metals
  - Antimony (SL = 31 mg/kg)
    - RA-RDSB-16E (0 to 0.5 feet) at a concentration of 34 mg/kg
  - Beryllium (SL = 1.6 mg/kg)
    - RA-RDSB-06 (4 to 5 feet) at a concentration of 2 mg/kg
    - RA-RDSB-06E (0 to 0.5 feet) at a concentration of 6.7 mg/kg

### Roadways Results (cont.)

- PAHs
  - No Detections above Screening Levels
- PCBs
  - No Detections above Screening Levels
- VOCs
  - 1,1-Dichloroethene detected at RA-RDSB-01E (9-10')
  - Concentration of 0.11 mg/kg (SL = 0.054 mg/kg)

### Sewer System Survey



## Sewer System

- Wastewater Results
- Sediment Results
- Soil Boring Results

## Sewer System Summary Table

Sample Type	# of Samples Collected	# of Samples with Detections above Screening Level				
		Metals	PCBs	SVOCs	TPH	VOCs
Wastewater	10	10	10	7*	0	7
Sediment	5	5	5	2*	5	3
Soil	92	8	0	0	3	0

\* Two wastewater and two sediment samples were not analyzed for SVOCs

## Sewer Wastewater Results

- Metals
  - Arsenic
    - 10 Detections above Screening Level (SL = 0.045 µg/L)
    - Min: 0.91 µg/L; Mean: 1.7 µg/L; Max: 3.2 µg/L (02WW-02)
  - Cadmium
    - Only detection above SL (5 µg/L) was 19 µg/L at 02WW-02
  - Lead
    - 8 Detections above Screening Level (SL = 15 µg/L)
    - Min: 15 µg/L; Mean: 106 µg/L; Max: 412 µg/L (02WW-01)

## Sewer Wastewater Results (Cont.)

- PCBs
  - PCB-1248
    - 10 Detections above Screening Level (SL = 0.034 µg/L)
    - Min: 0.13 µg/L; Mean: 1.65 µg/L; Max: 6.8 µg/L (SRWW-04)
- SVOCs
  - Benzidine
    - Only detection above Screening Level was 2.3 µg/L at SRWW-10 (0.00012 µg/L)
  - Benzo(a)anthracene
    - 7 Detections above Screening Level (SL = 0.0044 µg/L)
    - Min: 0.079 µg/L; Mean: 2.18 µg/L; Max: 9.7 µg/L (SRWW-04)

## Sewer Wastewater Results (Cont.)

- SVOCs (cont.)
  - Benzo(a)pyrene
    - 6 Detections above Screening Level (SL = 0.0092 µg/L)
    - Min: 0.13 µg/L; Mean: 2.62 µg/L; Max: 9.2 µg/L (SRWW-04)
  - Benzo(b)fluoranthene
    - 7 Detections above Screening Level (SL = 0.0044 µg/L)
    - Min: 0.11 µg/L; Mean: 2.95 µg/L; Max: 12 µg/L (SRWW-04)
  - Benzo(k)fluoranthene
    - 7 Detections above Screening Level (SL = 0.0044 µg/L)
    - Min: 0.092 µg/L; Mean: 1.64 µg/L; Max: 5.8 µg/L (SRWW-04)

## Sewer Wastewater Results (Cont.)

- SVOCs (cont.)
  - Chrysene
    - 7 Detections above Screening Level (SL = 0.0044 µg/L)
    - Min: 0.079 µg/L; Mean: 2.96 µg/L; Max: 13 µg/L (SRWW-04)
  - Dibenzo(a,h)anthracene
    - 4 Detections above Screening Level (SL = 0.0044 µg/L)
    - Min: 0.21 µg/L; Mean: 0.73 µg/L; Max: 1.8 µg/L (SRWW-04)
  - Indeno(1,2,3-cd)pyrene
    - 6 Detections above Screening Level (SL = 0.0044 µg/L)
    - Min: 0.08 µg/L; Mean: 2.40 µg/L; Max: 8.8 µg/L (SRWW-04)

## Sewer Wastewater Results (Cont.)

- VOCs
  - 1,1,1-Trichloroethane
    - Only detection above Screening Level was 340 µg/L at 02WW-02 (SL = 200 µg/L)
  - 1,1-Dichloroethene
    - 3 Detections above Screening Level (SL = 0.046 µg/L)
    - Min: 0.61 µg/L; Mean: 1.3 µg/L; Max: 2.1 µg/L (SRWW-03)
  - 1,2-Dichloroethane
    - 2 Detections above Screening Level (SL = 0.12 µg/L)
    - Min: 0.43 µg/L; Mean: 0.8 µg/L; Max: 1.2 µg/L (02WW-02)

## Sewer Wastewater Results (Cont.)

- VOCs (cont.)
  - 1,4-Dichlorobenzene
    - Only detection above Screening Level was 1.2 µg/L at SRWW-04 (SL = 0.5 µg/L)
  - Carbon Tetrachloride
    - Only detection above Screening Level was 2.1 µg/L at SRWW-06 (SL = 0.17 µg/L)
  - Chloroethane
    - 3 Detections above Screening Level (SL = 4.6 µg/L)
    - Min: 38 µg/L; Mean: 77 µg/L; Max: 150 µg/L (SRWW-02)

## Sewer Wastewater Results (Cont.)

- VOCs (cont.)
  - Chloroform
    - Only detection above Screening Level was 0.31 µg/L at SRWW-06 (SL = 0.16 µg/L)
  - Methylene Chloride
    - Only detection above Screening Level was 49 µg/L at 02WW-02 (SL = 4.3 µg/L)
  - Trichloroethene (TCE)
    - Only detection above Screening Level was 10 µg/L at SRWW-11 (SL = 1.6 µg/L)

## Sewer Wastewater Results (Cont.)

- VOCs (cont.)
  - Vinyl Chloride
    - Only detection above Screening Level was 0.51 µg/L at 02WW-02 (SL = 0.041 µg/L)

## Sewer Sediment Results

- Metals
  - Antimony
    - 4 Detections above Screening Level (Soil SL = 31 mg/kg)
    - Min: 39 mg/kg; Mean: 43.8 mg/kg; Max: 53 mg/kg (SRSD-03)
  - Arsenic
    - 4 Detections above Screening Level (Soil SL = 21.4 mg/kg)
    - Min: 3.2 mg/kg; Mean: 21.3 mg/kg; Max: 31 mg/kg (02SD-01)
  - Chromium
    - 3 Detections above Screening Level (Soil SL = 210 mg/kg)
    - Min: 215 mg/kg; Mean: 264 mg/kg; Max: 360 mg/kg (SRSD-02)

## Sewer Sediment Results (cont.)

- Metals (cont.)
  - Copper
    - Only detection above Screening Level was 1290 mg/kg at SRSD-03 (Soil SL = 1100 mg/kg)
  - Lead
    - Only detection above Screening Level was 3660 mg/kg at SRSD-04 (Soil SL = 1038 mg/kg)
  - Mercury
    - Only detection above Screening Level was 5.24 mg/kg at SRSD-02 (Soil SL = 0.6 mg/kg)

### Sewer Sediment Results (cont.)

- PCBs
  - PCB-1248
    - 5 Detections above Screening Level (Soil SL = 0.22 mg/kg)
    - Min: 3.2 mg/kg; Mean: 18.8 mg/kg; Max: 48 mg/kg (SRSD-02)
  - PCB-1260
    - 3 Detections above Screening Level (Soil SL = 0.22 mg/kg)
    - Min: 0.34 mg/kg; Mean: 1.18 mg/kg; Max: 1.8 mg/kg (02SD-01)
  - Total PCBs
    - Min: 3.54 mg/kg; Mean: 19.6 mg/kg; Max: 49.4 mg/kg (SRSD-02)

### Sewer Sediment Results (cont.)

- SVOCs
  - Di-n-octylphthalate
    - Only detection above Screening Level was 21 mg/kg at SRSD-02 (Soil SL = 0.3 mg/kg)
  - Acenaphthylene
    - Only detection above Screening Level was 0.591 mg/kg at SRSD-04 (Soil SL = 0.31 mg/kg)
  - Benzo(a)anthracene
    - Only detection above Screening Level was 80 mg/kg at SRSD-04 (Soil SL = 7.24 mg/kg)

### Sewer Sediment Results (cont.)

- SVOCs (cont.)
  - Benzo(a)pyrene
    - Only detection above Screening Level was 66 mg/kg at SRSD-04 (Soil SL = 4.10 mg/kg)
  - Benzo(b)fluoranthene
    - Only detection above Screening Level was 100 mg/kg at SRSD-04 (Soil SL = 4.90 mg/kg)
  - Benzo(g,h,i)perylene
    - Only detection above Screening Level was 44 mg/kg at SRSD-04 (Soil SL = 2.46 mg/kg)

### Sewer Sediment Results (cont.)

- SVOCs (cont.)
  - Benzo(k)fluoranthene
    - Only detection above Screening Level was 40 mg/kg at SRSD-04 (Soil SL = 6.2 mg/kg)
  - Chrysene
    - Only detection above Screening Level was 88 mg/kg at SRSD-04 (Soil SL = 36 mg/kg)
  - Dibenzo(a,h)anthracene
    - Only detection above Screening Level was 11 mg/kg at SRSD-04 (Soil SL = 1.52 mg/kg)

### Sewer Sediment Results (cont.)

- SVOCs (cont.)
  - Indeno(1,2,3-cd)pyrene
    - Only detection above Screening Level was 37 mg/kg at SRSD-04 (Soil SL = 1.99 mg/kg)
  - Phenanthrene
    - Only detection above Screening Level was 190 mg/kg at SRSD-04 (Soil SL = 15.2 mg/kg)
- TPH
  - 5 Detections above Screening Level (Soil SL = 200 mg/kg)
  - Min: 6,340 mg/kg (SRSD-04); Mean: 16,806 mg/kg; Max: 37,060 mg/kg (SRSD-02)

### Sewer Sediment Results (cont.)

- VOCs
  - 1,1,1-Trichloroethane
    - Only detection above Screening Level was 3900 mg/kg at 02SD-02 (Soil SL = 630 mg/kg)
  - 1,1-Dichloroethane
    - Only detection above Screening Level was 640 mg/kg at 02SD-02 (Soil SL = 590 mg/kg)
  - 1,1-Dichloroethene
    - Only detection above Screening Level was 0.083 mg/kg at SRSD-02 (Soil SL = 0.054 mg/kg)

## Sewer Sediment Results (cont.)

- VOCs (cont.)
  - 1,2-Dichloroethane
    - Only detection above Screening Level was 0.98 mg/kg at 02SD-02 (Soil SL = 0.35 mg/kg)
  - Chloroethane
    - 2 Detections above Screening Level (Soil SL = 3 mg/kg)
    - Min: 3 mg/kg (02SD-01); Max: 36 mg/kg (SRSD-02)
  - Chloroform
    - Only detection above Screening Level was 0.39 mg/kg at 02SD-02 (Soil SL = 0.24 mg/kg)

## Sewer Sediment Results (cont.)

- VOCs (cont.)
  - Methylene Chloride
    - Only detection above Screening Level was 221 mg/kg at 02SD-02 (Soil SL = 8.9 mg/kg)

## Sewer Soil Boring Results

- Metals
  - Beryllium
    - 8 Detections above Screening Level (SL = 1.6 mg/kg)
    - Min: 1.6 mg/kg; Mean: 2.4 mg/kg; Max: 3.6 mg/kg
- TPH
  - 3 Detections above Screening Level (SL = 200 mg/kg)
  - All in vicinity of Building 10, but below those samples
  - Min: 530 mg/kg; Mean: 560 mg/kg; Max: 600 mg/kg

## Groundwater

- No water bearing units identified during installation of four new wells (03MW-01, 08MW-01, -02, -03)
- New 4 wells sampled using disposable hand bailers approximately one week after development
- Existing 9 wells purged dry under low flow pumping, samples collected the following day using disposable hand bailers
- No recorded precipitation for 28 days prior to sampling, rain every day during sampling
- Turbidity ranges in wells
  - New wells: 1.5 to 2.8 NTU
  - Existing wells: 2.3 to 12.0 NTU with outliers at 52.4 (SWMW-03) and >1000 NTU (SWMW-07)

## Monitoring Well Results Summary Table

Sample Type	# of Wells Sampled	# of Samples with Detections above Screening Level									
		Extraneous	Metals	Nitrate	Phosphorus	PCBs	Perchlorates	SVOCs	VOCs	Chloride*	Fluoride*
Fire Hydrant	1	00	00	00	00	00	00	00	00	1	1
Building 2	1	0	1	0	0	0	0	1	1	00	00
Building 3	1	0	1	0	0	0	0	1	0	1	1
Building 8	3	0	3	0	0	0	0	3	0	2*	2*
Building 10	1	0	1	0	0	0	0	1	0	00	00
Site-Wide	7	0	7	0	0	0	0	7	0	00	00

\* Screening Levels for Chloride and Fluoride were not established (all detections are reported).

\* Only two of the three wells in this area were tested for Chloride and Fluoride.

## Monitoring Well Results

- Metals
  - Arsenic
    - Detected in all thirteen monitoring wells on site
    - Screening Level (SL) = 0.045 µg/L
    - Concentrations ranged from 0.33 to 7.8 µg/L
  - Lead
    - Detected only in well SWMW-07
    - Concentration was 44 µg/L (SL = 15 µg/L)

### Monitoring Well Results (cont.)

- SVOCs
  - 1,2-Diphenylhydrazine (1 Detection)
    - Concentration: 0.353 µg/L (SL = 0.084 µg/L)
  - Benzo(a)anthracene (10 Detections)
    - Range: 0.0044 - 0.066 µg/L (SL = 0.0044 µg/L)
  - Benzo(a)pyrene (10 Detections)
    - Range: 0.01 - 0.092 µg/L (SL = 0.0092 µg/L)
  - Benzo(b)fluoranthene (12 Detections)
    - Range: 0.0054 - 0.099 µg/L (SL = 0.0044 µg/L)

### Monitoring Well Results (cont.)

- SVOCs (cont.)
  - Benzo(k)fluoranthene (11 Detections)
    - Range: 0.0044 - 0.19 µg/L (SL = 0.0044 µg/L)
  - Chrysene (11 Detections)
    - Range: 0.0061 - 0.13 µg/L (SL = 0.0044 µg/L)
  - Dibenzo(a,h)anthracene (5 Detections)
    - Range: 0.0047 - 0.077 µg/L (SL = 0.0044 µg/L)
  - Indeno(1,2,3-cd)pyrene (5 Detections)
    - Range: 0.0066 - 0.11 µg/L (SL = 0.0044 µg/L)

### Monitoring Well Results (cont.)

- VOCs
  - Four compounds detected above SL at only one monitoring well, 02MW-01
    - 1,1-Dichloroethene, 34 µg/L (SL = 0.046 µg/L)
    - 1,2-Dichloroethane, 0.4 µg/L (SL = 0.12 µg/L)
    - Carbon Tetrachloride, 1 µg/L (SL = 0.17 µg/L)
    - Chloroform, 10 µg/L (SL = 0.16 µg/L)

### Monitoring Well Results (cont.)

- Indicator Parameters
  - Chloride
    - Fire Hydrant concentration was 27 mg/L
    - Well concentrations were 5, 7.2 and 95 mg/L
  - Fluoride
    - Fire Hydrant concentration was 1 mg/L
    - Well concentrations were 0.28, 0.33 and 0.44 mg/L
  - Residual Chlorine
    - Fire Hydrant concentration was 1 mg/L
    - Well concentrations were 0 to 0.5 mg/L

### Baseline Human Health Risk Assessment (HHRA)

- The goal of a Baseline HHRA is to estimate potential risks to current or future receptor populations at a site, assuming that current contamination is not remediated.
- For SLAAP, the HHRA is being developed to support potential property transfer. While the most likely future use of the site is industrial or commercial, additional less likely scenarios are also evaluated. Results of the HHRA will most likely be used to support a "no action" determination, deed restriction, site cleanup, or some combination thereof.

### Baseline HHRA (cont.)

- Primary medium of concern for the HHRA is soil. Groundwater is not used in the area, and exposure potential is limited. Buildings are evaluated separately using existing standards.
- Scenarios to be evaluated quantitatively in the HHRA:
  - Industrial/Commercial worker (surface soil)
  - Excavation worker (subsurface soil)
  - Hypothetical resident (surface soil)

### Baseline HHRA (cont.)

- Areas of Concern (AOCs)
  - Although most of the site is currently paved and/or covered with buildings, we do not know which, if any buildings are to be removed in the future.
  - Individual building footprints
  - Areas surrounding buildings

### Baseline HHRA (cont.)

- Chemicals of Potential Concern (COPCs)
  - Focuses on those classes of compounds known or suspected to be present, based on past site history and results of initial EBS.
  - Site data are screened against conservative screening criteria (CALM and Region IX PRGs) to identify COPCs for evaluation in the HHRA.

### Baseline HHRA (cont.)

- Chemicals of Potential Concern (cont.)
  - PCBs and PAHs appear to be the primary COPCs, although other chemicals (pesticides, metals, etc.) are found sporadically in some AOCs.
  - Dioxin is a big unknown. Sampling in Building 2 show the presence throughout the building and in soils (surface and subsurface). Dioxin has not been characterized in other areas.

### Baseline HHRA (cont.)

- Type of risk analysis to be performed
  - Reasonable Maximum Exposure (RME) and Central Tendency Exposure (CTE). RME provides an estimate of upperbound risks among most highly exposed individuals, CTE estimates risks to the "average" receptor.
  - "Hotspot" analysis (data from known areas of contamination) and representative exposure (data averaged across the building footprint).

### Baseline HHRA (cont.)

- Status of HHRA
  - Data have been collected, validated and entered into database (except for supplemental samples).
  - COPC screening is the next step.

**Dioxins-PCBs**

EPA Sample ID	Sample ID	Sample Depth from Floor Surface (Ft.)	TEQ (PG/G)	Total PCB (mg/kg)
	RA-02SB-01(0-0.5)-0902	1	135.20	14.00
	RA-02SB-01(04-05)-0902	5	6.50	0.05
	RA-02SB-01(09-10)-0902	10	44.07	0.06
	RA-02SB-02(0-0.5)-0902	1	29.73	0.01
	RA-02SB-02(04-05)-0902	5	3.49	0.02
	RA-02SB-04(0-0.5)-0902	4	3.84	0.01
	RA-02SB-04(04-05)-0902	8	5.72	0.01
	RA-02SB-06(0-0.5)-0902	1	42.40	0.01
	RA-02SB-07(0-0.5)-0902	1	88.68	0.03
	RA-02SB-09(0-0.5)-0902	4	18.07	0.02
	RA-02SB-09(04-05)-0902	8	5.72	0.01
	RA-02SB-09(09-10)-0902	13	3.92	0.03
	RA-02SB-10(0-0.5)-0902	1	23.14	0.19
	RA-02SB-10(04-05)-0902	5	59.55	0.05
	RA-02SB-10(09-10)-0902	10	5.10	0.01
	02SB-01(0-0.5)-0902	1	13.15	0.02
	02SB-01(09-10)-0902	10	313.84	2.50
	02SB-02 (0-0.5)-0902	1	102.94	0.02
	02SB-02 (09-10)-0902	10	16.08	0.02
	02SB-03 (0-0.5)-0902	1	93.98	0.01
	02SB-04(04-05)-0902	5	40.18	0.01
	02SB-04(09-10)-0902	10	25.36	0.03
	02SB-05(0-0.5)-0802	9	0.87	0.02
	02SB-05(04-05)-0802	13	8.15	0.04
	02SB-05(09-10)-0802	18	9.55	0.04
	02SB-07(0-0.5)-0802	8	1.51	0.01
	02SB-08(0-0.5)-0802	8	104.47	0.18
	02SB-09(04-05)-0802	12	29.72	0.04
	02SB-09(09-10)-0802	17	4.28	0.01
	02TS-02(0-0.5)-0902	2	89.72	6.20
EPA-104	02TS-02(0-0.5)-0902(EPA-104)	2	486.00	5.50
	02TS-03(0-0.5)-0902	8	5.94	0.01
EPA-103	02TS-03(0-0.5)-0902(EPA-103)	8	4.98	U(0.4)

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**Dioxins-PCBs**

EPA Sample ID	Sample ID	Sample Depth from Floor Surface (Ft.)	TEQ (PG/G)	Total PCB (mg/kg)
	02TS-04(0-0.5)-0902	5	7.33	0.06
	02TS-05(0-0.5)-0902	6	206.76	0.12
	02TS-05(02-03)-0902	8	114.54	0.17
	02TS-05(04-05)-0902	10	43.22	0.04
	02TS-06(0-0.5)-0902	8	4.76	0.01
	02TS-07(0-0.5)-0902	2	85.97	0.03
	02TS-08(0-0.5)-0902	2	46.94	1.30
	02TS-09(0-0.5)-0902	7	49.85	1.02
EPA-105	02TS-09(0-0.5)-0902(EPA-105)	7	37.00	1.44
	02TS-09(04-05)-0902	11	9.20	0.07
	02CS-01(0-0.1)-0802		NA	10.20
EPA-11	02CS-01(0-0.1)-0802(EPA-11)		7130.00	12.00
	02CS-02(0-0.1)-0802		NA	1.80
EPA-16	02CS-02(0-0.1)-0802(EPA-16)		1090.00	1.90
	02CS-03(0-0.1)-0802			3.65
	02CS-04(0-0.1)-0802		NA	1.27
EPA-12	02CS-04(0-0.1)-0802(EPA-12)		2.40E-04	0.85
	02CS-05(0-0.1)-0802		NA	1.43
	02CS-06(0-0.1)-0802		NA	0.50
EPA-13	02CS-06(0-0.1)-0802(EPA-13)		1.64E-04	0.58
	02CS-07(0-0.1)-0802		NA	3.06
	02CS-08(0-0.1)-0802		NA	2.10
EPA-14	02CS-08(0-0.1)-0802(EPA-14)		3.27E-04	2.10
	02CS-09(0-0.1)-0802		NA	0.91
	02CS10(0-0.1)-0802		NA	0.09
EPA-15	02CS10(0-0.1)-0802(EPA-15)		7.13E-06	0.73
	02PD-01-0802		NA	10.00
EPA-1	02PD-01-0802(EPA-1)		1.23E-05	7.80
	02PD-02-0802		NA	U(0.5)
	02SD-01-0802		NA	20.80
	02SD-02-0802		NA	3.54
	RDSB-10(0-0.5)-0802	1	NA	U(0.2)
EPA-101	RDSB-10(0-0.5)-0802(EPA-101)	1	1.33E-06	U(0.041)
	RRSB-04(04-06)-0802	5	NA	U(0.2)
EPA-102	RRSB-04(04-06)-0802(EPA-102)	5	1.70E-08	U(0.04)
	01SB-04(0-1)-0802	6	NA	U(0.2)
EPA-106	01SB-04(0-1)-0802(EPA-106)	6	3.84E-07	U(0.043)

Sample ID	Dioxin TEQ* (PG/G)
02SB-01(0-0.5)-0902	13.15
02SB-01(09-10)-0902	313.84
02SB-02(0-0.5)-0902	102.94
02SB-02(09-10)-0902	16.08
02SB-03(0-0.5)-0902	93.98
02SB-04(04-05)-0902	40.18
02SB-04(09-10)-0902	25.36
02SB-05(0-0.5)-0802	0.87
02SB-05(04-05)-0802	8.15
02SB-05(09-10)-0802	9.55
02SB-07(0-0.5)-0802	1.51
02SB-08(0-0.5)-0802	104.47
02SB-09(04-05)-0802	29.72
02SB-09(09-10)-0802	4.28
02TS-02(0-0.5)-0802	89.72
02TS-03(0-0.5)-0802	5.94
02TS-04(0-0.5)-0802	7.33
02TS-05(0-0.5)-0902	206.76
02TS-05(02-03)-0902	114.54
02TS-05(04-05)-0902	43.22
02TS-06(0-0.5)-0902	4.76
02TS-07(0-0.5)-0902	85.97
02TS-08(0-0.5)-0902	46.94
02TS-09(0-0.5)-0802	49.85
02TS-09(04-05)-0902	9.20
RA-02SB-01(0-0.5)-0902	135.20
RA-02SB-01(04-05)-0902	6.50
RA-02SB-01(09-10)-0902	44.07
RA-02SB-02(0-0.5)-0902	29.73
RA-02SB-02(04-05)-0902	3.49
RA-02SB-04(0-0.5)-0902	3.84
RA-02SB-04(04-05)-0902	5.72
RA-02SB-06(0-0.5)-0902	42.40
RA-02SB-07(0-0.5)-0902	88.68
RA-02SB-09(0-0.5)-0902	18.07
RA-02SB-09(04-05)-0902	5.72
RA-02SB-09(09-10)-0902	3.92
RA-02SB-10(0-0.5)-0902	23.14

RA-02SB-10(04-05)-0902	59.55
RA-02SB-10(09-10)-0902	5.10
Notes:	
* = TEQ was calculated based on the maximum result for any detected compound (including re-analyses and dilution analyses) and 1/2 the detection limit for compounds that weren't detected.	

**ATTACHMENT 3**  
**PROPOSED CONTINGENCY SAMPLING PLAN**

## **CONTINGENCY SAMPLING PLAN**

### **SITE SPECIFIC ENVIRONMENTAL BASELINE SURVEY - ST. LOUIS ARMY AMMUNITION PLANT**

The basis for this sampling plan is as follows:

- Soil borings to characterize sewer breaches will be installed within approximately 25 ft of each breach location where contaminants were detected in the sewer sediment or water samples immediately upstream of the breach. The relatively high hydraulic conductivity of the granular bedding material around the sewer lines, compared to the surrounding clays, would tend to transport contaminants away from the breach making closer sample intervals unnecessary.
- Beryllium detections above the screening level were observed in several locations across the site, typically in native clays deeper than 10 ft. below ground surface (bgs). Anecdotal evidence suggests that beryllium may be a naturally occurring constituent of the clay and not a site-related contaminant, therefore contingency samples are not recommended to address this contaminant. Also there is no exposure route in deep soils, making additional data unnecessary for the SSEBS or Risk Assessment.
- Copper was detected in one sample above the screening level at 0-0.5 ft. bgs in the parking area west of Building 1 outside the former billet storage yard. Since process knowledge does not indicate that metals were stored outside the yard, and the other samples from this boring and surrounding borings were well below the screening levels, further sampling is not recommended.
- Based on the investigation results and the Field Sampling Plan, the following additional contingency samples are recommended:

#### **Sewers**

- 10 Geoprobe borings (average 25-ft. depth)
  - 30 Samples for VOC, SVOC, PCB, Metals and TPH-DRO analysis
- 5 Sediment samples to determine presence of Dioxin in sewer system (all locations previously sampled and in close proximity to Building 2)
  - 5 Samples for PCB and Dioxin analysis

#### **Railroads**

- 4 Geoprobe borings (1-ft. depth) to identify extent of 1,1-DCE at RA-RRSB-10
  - 4 Samples for VOC analysis

#### **Roadways**

- 3 Geoprobe borings (1-ft. depth) to identify extent of antimony at RA-RDSB-16E
  - 3 Samples for Metals analysis
- 2 Geoprobe borings (10-ft. depth) to identify extent of 1,1-DCE at RA-RDSB-01E
  - 2 Samples for VOC analysis

#### **Building 1**

- 3 Geoprobe borings (1-ft. depth) to identify extent of PCB at 01-SB10 Shallow
  - 3 Samples for PCB analysis

#### **Building 2**

- 10 Geoprobe borings (10-ft. depth) to identify extent of PCB/Dioxin around building
  - 30 Samples for PCB and Dioxin analysis

#### **Building 4**

- 2 Hand Auger borings (3-ft. depth) to investigate PCBs below concrete samples 04CS-02 and 04CS-03
- 4 Samples for PCB analysis

#### **Building 6**

- 1 Hand Auger boring (5-ft. depth) to determine depth of Mercury and Pesticides at RA-06SB-04
- 1 Sample for Metals and Pesticide analysis

#### **Building 7**

- 1 boring co-located with sewer boring (1-ft. depth) to identify extent of PCB at RA-07SB-02
- 1 Sample for PCB analysis

#### **Building 8**

- 1 Geoprobe boring (1-ft. depth) to identify extent of 1,1-DCE at RA-08SB-05
- 1 Sample for VOC analysis
- 2 Geoprobe borings (12-ft. depth) to identify extent of TPH at 08SB-07
- 2 Samples for TPH-DRO analysis

#### **Building 10**

- 4 Geoprobe borings (20-ft. depth) to identify extent of TPH around former underground storage tanks (originally detected in SRSB-18 and SRSB-19)
- 4 Geoprobe borings (12-ft. depth) to identify extent of TPH at SRSB-16
- 8 Samples for TPH-DRO analysis

#### **No Additional Sampling**

- Building 3
- Building 5
- Northeast Parking Area
- Groundwater

#### **Totals**

- 43 Geoprobe borings
- 3 Hand Auger borings

#### **Analyses**

- 35 Dioxin
- 34 Metals
- 1 Pesticide
- 73 PCB
- 30 SVOC
- 40 TPH-DRO
- 37 VOC

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